

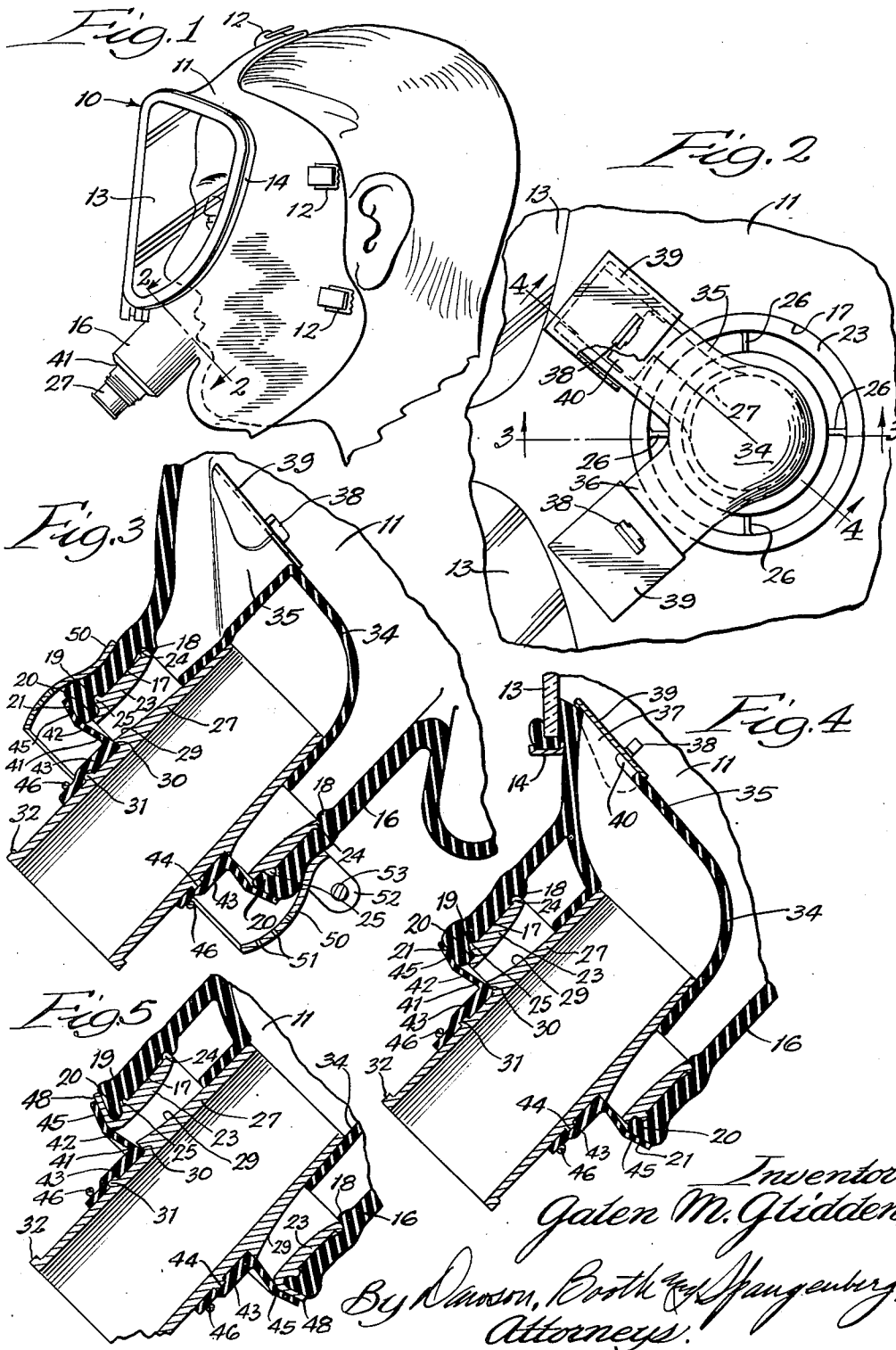
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GAS MASK

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GAS MASK

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2 Claims. (Cl. 128-141)

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This invention relates to gas masks and more particularly to improvements in gas masks of the type shown and described in T. A. O'Leary Patent No. 2,132,433, patented October 11, 1938.

An object of this invention is to provide an improved gas mask wherein air may be conveniently supplied and exhausted through a single opening in the gas mask, wherein the supply and exhaust of air is simply and safely controlled, wherein fogging of the lenses thereof is effectively prevented, wherein sputum is automatically drained therefrom, wherein the exhaust valve and dead air check valves may be readily replaced, and wherein the action of the exhaust valve may be readily predetermined.

In carrying out this object of the invention, the gas mask is preferably molded from rubber and is provided with a cylindrical opening in line with the mouth. A sleeve is located in the opening and carries internally thereof a tube thereby defining an interior air supply passage and an exterior air exhaust passage. A rubber diaphragm valve removably secured to the exterior of the tube seats at the end of the cylindrical opening and controls the air exhaust passage. The air supply passage connects with inlet passages formed in the mask portion and scoop-type dead air check valves removably secured to the mask portion direct the air supply against the lenses to prevent fogging thereof. Sputum readily drains through the cylindrical opening past the exhaust valve.

Further objects of this invention reside in the details of construction of and the cooperative relation between the component parts forming the gas mask of this invention.

Other objects and advantages will become apparent to those skilled in the art upon reference to the accompanying specification, claims, and drawing in which —

Figure 1 illustrates the gas mask applied to the face of the wearer;

Figure 2 is a partial view of the interior of the gas mask taken substantially along the line 2-2 of Fig. 1;

Figure 3 is a partial vertical sectional view taken substantially along the line 3-3 of Fig. 2;

Figure 4 is a partial vertical sectional view taken substantially along the line 4-4 of Fig. 2;

Figure 5 is a partial sectional view similar to Fig. 4 but showing another form of the invention.

Referring first to Fig. 1, the gas mask is generally designated at 10 and it includes a face portion 11 for snugly fitting over the face of the wearer. The face portion may be provided with

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a plurality of buckles 12 for receiving straps for securing the face portion to the face of the wearer. The gas mask is also provided with a pair of lenses or windows 13 which are held in place in the face portion 11 by means of rims 14. The face portion 11 of the gas mask may be suitably molded from rubber or similar material.

The face portion 11 of the gas mask is formed with a cylindrical extension 16 having an opening 17 therein, which opening is in alignment with the mouth of the wearer. The opening 17 in the cylindrical extension 16 communicates directly with the interior of the gas mask and the lower surface thereof merges with the portion 15 of the gas mask which engages and seals the chin. This cylindrical opening 17 is provided with an internal shoulder 18, an internal groove 19, and an internal shoulder 20. The exterior end of the cylindrical extension 16 is provided with a valve seat surface 21 which accordingly is located at the exterior end of the cylindrical opening 17.

A metallic sleeve 23 is located within the cylindrical opening 17 and is provided with a pair of shoulders 24 and 25 for securely retaining the sleeve within the cylindrical opening 17 and for accurately positioning the sleeve therein. In this respect, the shoulder 24 cooperates with the shoulder 18 and the shoulder 25 cooperates with the groove 19 and the shoulder 20, whereby movement of the sleeve 23 in the opening 17 is prevented after the sleeve has been inserted therein. Because the extension 16 is made of rubber or like material, the sleeve 23 may be readily inserted in the opening 17 and is maintained in the proper position therein. The sleeve 23 is provided with webs 26 for carrying a tube 27 internally thereof and in spaced relation thereto in order to provide an air supply passage internally of the tube 27 and an air exhaust passage between the tube 27 and the sleeve 23.

Preferably, the tube 27 is rigidly or integrally secured to the webs 26 which, in turn, are rigidly or integrally secured to the sleeve 23 whereby the position of the tube 27 is fixed with respect to the sleeve 23 and hence to the annular valve seat 21.

The exterior of the tube 27 adjacent the sleeve 23 is flared outwardly as indicated at 29 to provide a shoulder 30 and to direct the exhaust air outwardly. The tube 27 is also provided with a shoulder 31, and a shoulder 32 operates to assist in the securing of the conventional flexible air supply tube to the tube 27.

The inner end of the tube 27 is received in an

air inlet passage 34 which communicates with a pair of inlet passages 35 and 36 which, in turn, are provided with air inlet openings 37 adjacent the lenses or windows 13. Preferably, the air inlet passages 34, 35 and 36 are molded in the face portion 11 of the gas mask to form an integral construction. The air inlet passages 35 and 36 are provided with integral tongues 33 which are received in slots formed in scoop-type dead air check valves 39 having side flanges. The tongues 38 are formed on extensions 40 of the top walls of the inlet passages 35 and 36, and the scoop-type dead air check valves 39 overlie the slits at the sides of the extensions 40. The dead air check valves operate to control the openings 37 and pivot freely at the extensions 40. The scoop-dead air check valves 39 open toward the lenses or windows 13 so that when the check valves 39 are opened, the air supply is directed against the windows or lenses 13 to prevent fogging of the same. The side flanges on the check valves 39 assist in directing the air supply against the windows.

A diaphragm exhaust valve is designated at 41 and includes a diaphragm or disc portion 42 and a sleeve portion 43. Preferably, the diaphragm valve is preformed from rubber or similar material. The interior of the sleeve portion 43 of the diaphragm valve is provided with a groove 44. The diaphragm valve 42 is located on the tube 27 and the inner face thereof engages the shoulder 30 and the groove 44 engages the shoulder 31 so that the diaphragm valve is securely retained on the tube 27 and is accurately positioned with respect to the valve seat 21. The outer edge of the valve portion 42 of the diaphragm valve is frusto-conical in formation so that when the diaphragm valve is moved against the seat 21, the outer edge of the diaphragm valve first engages the seat and then the remainder thereof engages the seat. Thus, a pressure-tight seal between the diaphragm valve and the seat is assured. If desired, a ring 46 may clamp the outer end of the sleeve portion 43 of the diaphragm valve to the tube 27.

In the operation of the gas mask, when the wearer inhales, the diaphragm valve 41 is closed to seal the exhaust air passage and the dead air check valves 39 are opened to admit air to the gas mask. This action of the valve is caused by reduced air pressure within the gas mask. Upon exhalation, the dead air check valves 39 are closed and the diaphragm exhaust valve 41 is opened to exhaust air from the gas mask. This operation of the valve is caused by an increase in air pressure within the gas mask. In the operation of the dead air check valves 39, they pivot freely about the extensions 40. In the operation of the diaphragm exhaust valve 41, there is a general flexing action throughout the entire diaphragm portion 42 thereof. Due to the frusto-conical shape of the edge of the diaphragm exhaust valve, the edge first engages the seat 21 during the closing operation and then the remainder thereof engages, and during the opening operation the edge is the last to leave the seat 21.

The opening 17 in the gas mask being in alignment with the nose and mouth of the wearer, operates to provide direct air supply to and air exhaust from the nose and mouth of the wearer. Also, the air exhaust passage around the tube 27 provides for a direct automatic drain of sputum from the gas mask; the sputum automatically draining out past the exhaust valve. Since the

lower surface of the opening 17 merges with the portion of the gas mask engaging and sealing the chin, pockets for collecting sputum are eliminated and a direct unimpeded drain is provided. The exhaust valve being of diaphragm construction operates as a diaphragm for voice transmission purposes.

If the tension of the diaphragm is not proper for easy and effective operation thereof, then the tension may be changed by substituting a new tube and sleeve assembly in the cylinder opening 17 which new assembly may have a slightly different spacing of the shoulders 30 and 31. In this way, the position of the sleeve portion 43 of the diaphragm valve may be predetermined with respect to the position of the seat 21 for obtaining predetermined tension in the diaphragm exhaust valve. The tension of the diaphragm may also be determined by substituting different diaphragm values of slightly different dimensions.

It will be noted that the rubber diaphragm valve fits against the rubber seat 21 and by the engagement of rubber against rubber, an extremely effective seal is provided.

In order to protect the diaphragm valve, it may be encircled by a guard 50 having perforations 51. The guard may be in the form of a clamp provided with ears 52 drawn together by a nut and screw 53, as illustrated in Fig. 3. The guard in addition to protecting the diaphragm valve also assures that the sleeve 23 is retained in the extension 16.

In the other form of the invention, illustrated in Fig. 5, a metal seat is utilized in lieu of the rubber seat 21. The metal seat designated at 48 is formed on the metal sleeve 23. The operation of this form of the invention is the same as that of the other form.

While for purposes of illustration two forms of this invention have been disclosed, other forms thereof may become apparent to those skilled in the art upon reference to this disclosure and, therefore, this invention is to be limited only by the appended claims and prior art.

I claim:

1. A gas mask comprising a face portion having sight windows and a hollow cylindrical extension communicating directly with the interior of the face portion in alignment with the mouth of the wearer and extending outwardly and downwardly therefrom, a tube of smaller diameter secured within the hollow cylindrical extension to provide an interior air supply passage through the tube and an annular exterior air exhaust passage between the tube and the cylindrical extension, the air exhaust passage communicating directly with the interior of the face portion at the mouth of the wearer also to provide an unimpeded sputum drain therethrough, an annular seat at the exterior end of the hollow cylindrical extension, an annular diaphragm valve secured to the outer surface of the tube to engage with the annular seat at the exterior end of the hollow cylindrical extension freely to control the air exhaust passage and freely to permit escape of sputum, an air inlet passage formed interiorly in the face portion and connected to and communicating with the interior end of the tube and communicating with the interior of the face portion adjacent the sight windows, and dead air check valves pivoted on the air inlet passage adjacent the sight windows and having side flanges for controlling the air inlet passage where it communicates with the interior of the face

portion to control the air supply and direct the air supply toward the sight windows.

2. A gas mask comprising a molded rubber face portion having a sight window, an air inlet passage interiorly molded in the face portion and having an opening adjacent the sight window, a flexible extension in the opening extending toward the window, and a dead air check valve having side flanges carried by the extension for overlying and sealing the opening in closed position and for directing air onto the sight window in open position.

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